Attachment E: SWWTP Long Term Disposal Solution – Outfall Assessment

Report

02 February 2026

To	Scott Paterson	**Contact No.**	03 370 8280
Copy to	-	**Email**	**Anthony.Kirk@ghd.com**
From	GHD	**Project No.**	12645246
Project Name	Shotover WWTP Disposal Field Alternative Discharge		
Subject	Shotover WWTP Effluent Disposal – Outfall Options Decision Memo		

1. Introduction

Queenstown Lakes District Council (Council) is currently finalising the selection of the preferred effluent discharge option for the Shotover WWTP long term disposal project. At present, all proposed options include a discharge (outfall) to the Kawarau River. Currently, the rock outfall method has been proposed as part of the options; however, there are notable benefits to a diffuser type outfall into the river. Assessment and design are required to support consenting of a discharge option. A decision is required from Council to confirm the preferred outfall method.

1.1 Purpose of this Report

This Report provides information and an indicative design for the outfall methods to discharge treated effluent into the Kawarau River. This is to inform Council for making a decision on which outfall method is preferred.

Note: The indicative layouts presented in this report are intended solely for comparative analysis. Upon selection of the preferred option, preliminary design will be conducted based on the chosen method.

1.2 Scope and limitations

This report: has been prepared by GHD for Queenstown Lakes District Council and may only be used and relied on by Queenstown Lakes District Council for the purpose agreed between GHD and Queenstown Lakes District Council as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Queenstown Lakes District Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Accessibility of documents

If this Report is required to be accessible in any other format this can be provided by GHD upon request and at an additional cost if necessary.

GHD has prepared the preliminary cost estimate set out in section 5 of this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD.

The Cost Estimate has been prepared for the purpose of comparing the outfall options and are not intended for budgeting purposes and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the works can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.

2. Outfall Options - Basis of design

This section outlines parameters and criteria that will form the basis of the design for the outfall solution.

2.1 Design horizon

The design horizon for the alternative effluent disposal solution is 35 years (i.e. 2060), based on obtaining a long-term resource consent.

2.2 Treated wastewater effluent

The following Table 1 provides the current and projected flows leaving the Shotover WWTP, taken from the Shotover WWTP Discharge Short List Report (GHD, 2025).

Table 1 Shotover WWTP flows

	Recent WW Flows (Discharge Flow)		**Wastewater Flow Estimations**			
Year	**2023**	**2024**	**2030**	**2040**	**2048**	**2060**
Average Population	46,002	49,359	57,265	69,892	82,325	94,887
Peak Day Population	65,685	72,565	84,830	103,759	122,399	141,233
ADF (m^3/d)	9,995	12,060	15,061	19,080	22,475	25,904
PDWF (m^3/d)	13,388	15,934	18,675	22,897	26,970	31,085
PWWF (m^3/d)	18,861	32,724	34,640	43,885	51,692	59,579

Additional parameters which require consideration in the design of the outfalls include:

- Maximum Instantaneous flow in outfall discharge design (2060): 694 L/s
- Minimum flow (current): 144 L/s, based on current average daily flow of 12,500 m^3/d
- Minimum flow (2030): 174 L/s, based on the estimated 2030 average daily flow of 15,061 m^3/d
- Treated effluent composition is low in solids, expected median TSS < 5 mg/L, typically 2 mg/L
- Average temperature at the treated effluent (based off bioreactor results from January 2025 to January 2026): 17.5 ℃

2.3 Kawarau River parameters

The Kawarau River is predominantly schist geology. The following Table 2 provides a summary of the Kawarau River parameters near the location of the proposed effluent outfall.

Table 2 Kawarau River preliminary parameters

Parameter	Location	Value	Source
Mean annual low flow (MALF)	Kawarau River (upstream of the Shotover Delta)	71 m^3/s	Estimated on NZ River Maps NIWA
Median flow	Kawarau River (upstream of the Shotover Delta)	179 m^3/s	Estimated on NZ River Maps NIWA
Median flow	Kawarau at Chard Road	175 m^3/s	Flow meter in the Kawarau, data from the ORC Environmental Data Portal
High flow	Kawarau at Chard Road	>291 m^3/s	Flow meter in the Kawarau, data from the ORC Environmental Data Portal
Flood warning alert	Kawarau at Chard Road	400 m^3/s	Flow meter in the Kawarau, data from the ORC Environmental Data Portal.
Maximum water level	Kawarau US of Shotover Delta	310.9 mAD	Estimated from Haskoning Report figures (Haskoning, 2025)
Minimum water level	Kawarau US of Shotover Delta	308.1 mAD	Estimated from Haskoning Report figures (Haskoning, 2025)
Maximum water level	Kawarau DS of Shotover Delta	310.4 mAD	Estimated from Haskoning Report figures (Haskoning, 2025)
Minimum water level	Kawarau DS of Shotover Delta	307.6 mAD	Estimated from Haskoning Report figures (Haskoning, 2025)
Average temperature	Kawarau directly US and DS of the Shotover delta	10℃	Taken from GHD sampling data in 2025, at the Kawarau directly US and DS of the Shotover delta. (49 samples used).
Estimated density	Kawarau directly US and DS of the Shotover delta	999.77 kg/m^3	Estimated based off temperature of river.

***This location is situated upstream of the delta, where the lake converges with the Kawarau; therefore, these levels are not applicable for assessment purposes. It should be noted, however, that this dataset spans a significantly longer duration (55 years) compared to the river level data collected near the delta (7 years).*

Cross section surveys performed on the Kawarau indicate that its depth varies given the season and location. The depth near the location of the proposed outfalls is estimated to be anywhere between 4 to 6m (maximum depth estimated to be 6m). This is based off recent cross section surveys as outlined in the following figures (Figure 1 to Figure 4).

Figure 1 *Kawarau River cross-section survey locations. (ORC, 2024))*

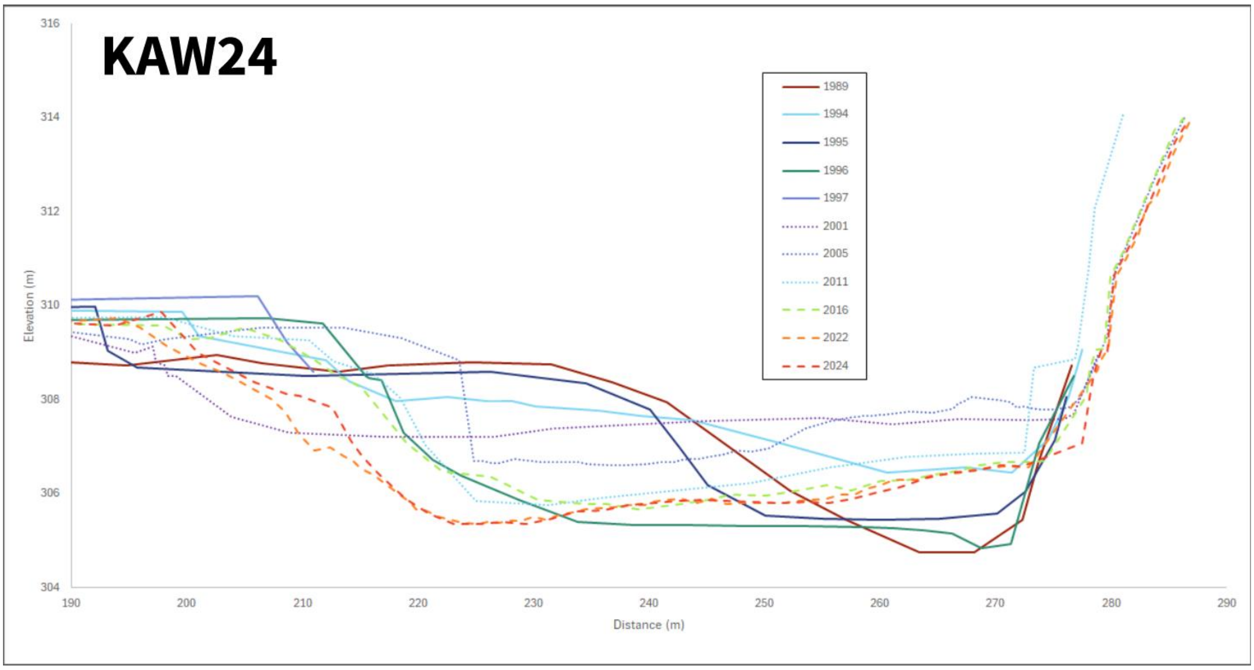


Figure 2 *Kawarau River cross-section 24. Dotted line type denotes surveys post November 1999 and dashed line type post training line construction (2011) (Haskoning, 2025)*

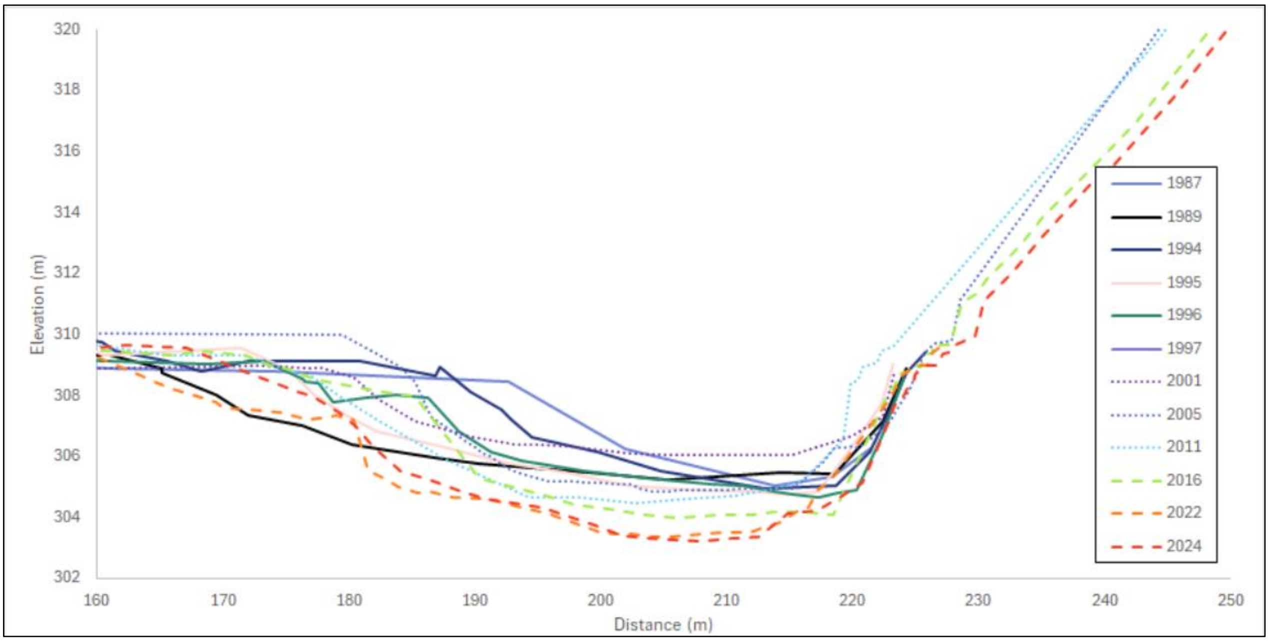


Figure 3 Kawarau River cross-section 25. Dotted line type denotes surveys post November 1999 and dashed line type post training line construction (2011) (Haskoning, 2025)

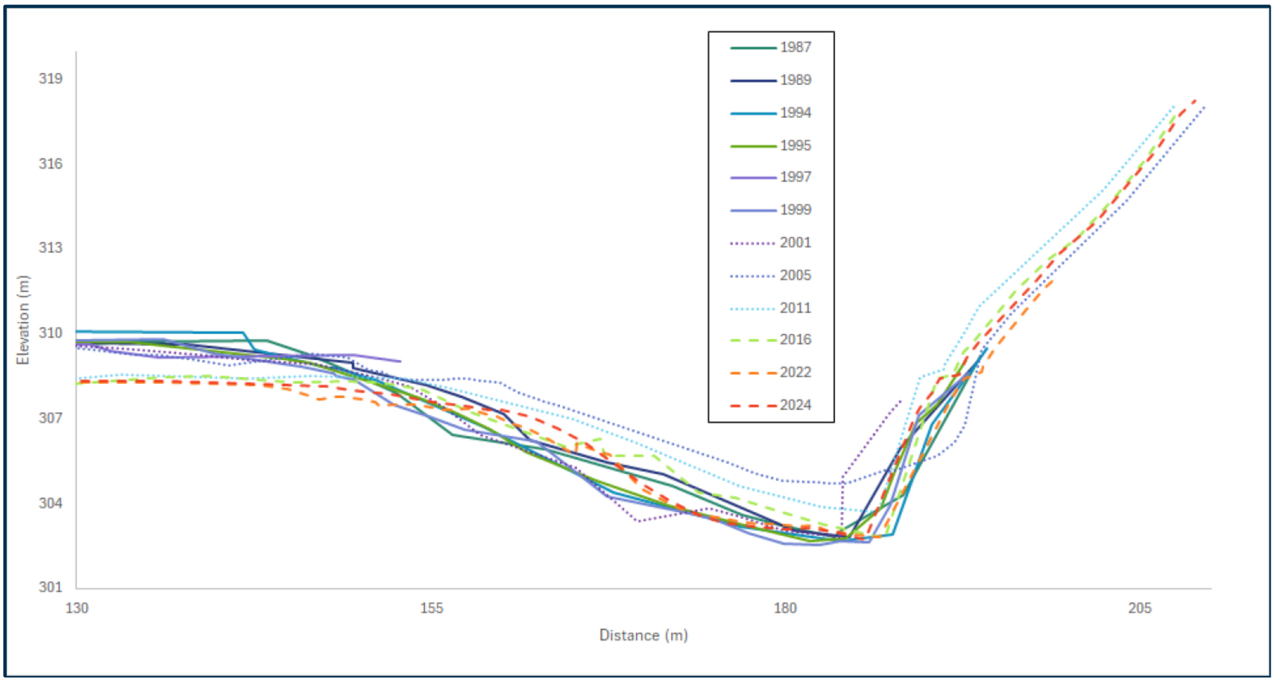


Figure 4 Kawarau River cross-section 26. Dotted line type denotes surveys post November 1999 and dashed line type post training line construction (2011)

2.4 Conveyance system

The conveyance system from the treatment plant to the location of the outfall is proposed to be in form of a gravity pipeline. The discharge from the UV system over the existing weir will be directed in a new manhole with the outlet pipe continuing towards south and then turning right along the training line. The pipe size is estimated to be with an internal diameter of 800mm, approximately. This equals to a OD900 or OD1000 PE pipe dependent to pressure rating to be determined during detailed design. Different pipe materials will be assessed in the design stage.

The conveyance pipe will discharge to a new proposed manhole likely to be fully buried or partially buried dependent to the final location to be determined in design stage. Additional five or six manholes are likely to be required to provide access for maintenance and facilitate the change of directions. DN1500 standard manhole is deemed to be sufficient to accommodate the proposed conveyance pipe and direction changes.

The conveyance pipe is proposed to be installed to the end of training line, approximately, for the rock outfall option where the river condition is more suitable to meet the quality requirements. On the diffuser option, the discharge manhole will be located close to Section KAW25 shown in Figure 1 (refer to Section 4 for more details). The length of the conveyance pipe will be approximately 1250m for rock outfall options and 1050m for the diffuser option.

The outlet from discharge manhole will be in from of a manifold with multiple outlets to distribute the flow across the rock outfall and dissipate any excessive energy. Alternatively, the outlet pipe at the discharge manhole will be on a straight alignment towards the riverbank to continue under the river's main channel to the diffuser lateral. Refer to sections 0 and 4 for more details.

The overview of conveyance system is shown in Figure 5 and in summary includes following:

- Approximately 1.2km 800mm ID pipe (or suitable alternative conveyance structure) to connect the UV outlet or wetland outlet (depending on the option) to the land flow path structure, covering an approximate distance of 1.4 km.
- 5 to 6 DN1500 manholes to accommodate changes in direction and discharge to the disposal system.
- Discharge system in form of manifold with outlet blended in gabion baskets for rock outfall option and or a buried pipe for the diffuser option.

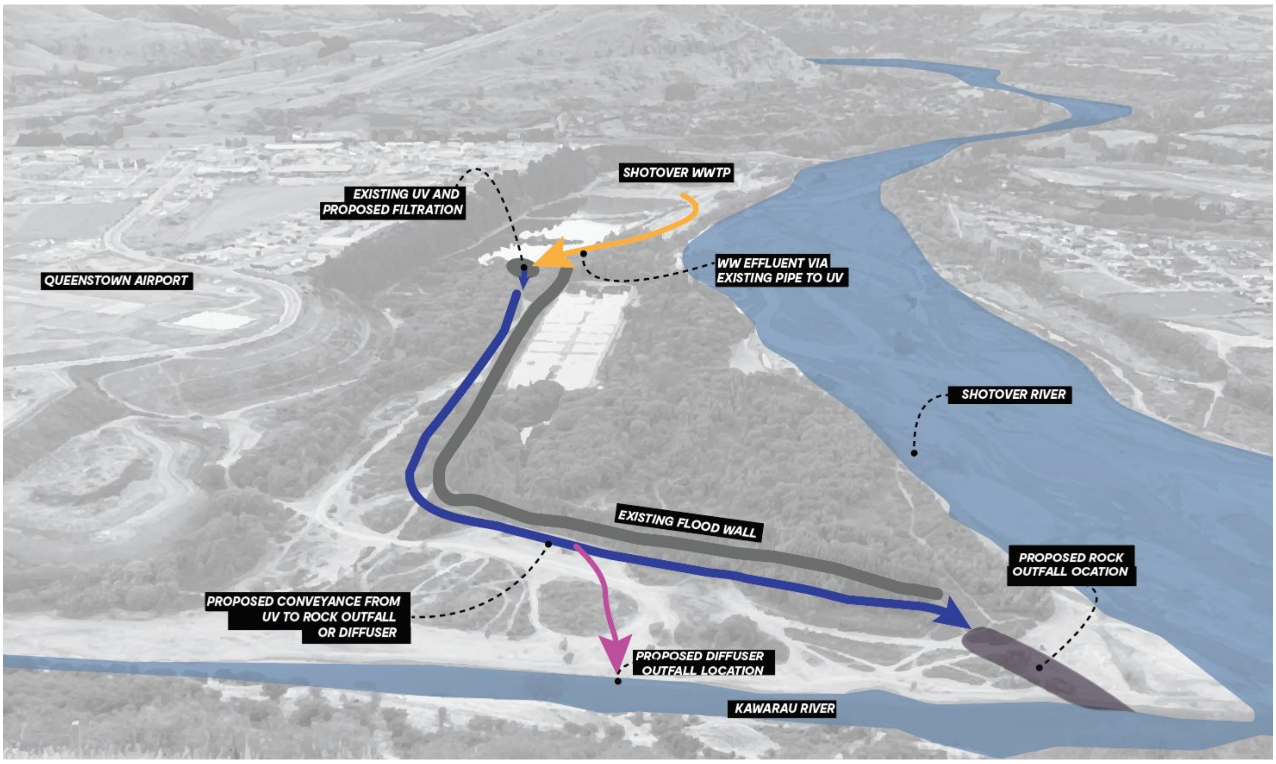


Figure 5 *Conveyance*

Note: The blue line shows the current conveyance. The blue arrow shows where the conveyance would be if the rock outfall is selected. The purple arrow shows the conveyance if the diffuser outfall is selected.

2.5 Dilution

Dilution performance is defined as the ratio of ambient river water mixed with the discharged effluent and is assessed using percentile-based compliance metrics to account for temporal variability in river flow conditions. Plume dilution at a given location is defined as:

$$D_x = \frac{C_0 - C_A}{C_x - C_A}$$

where:

D_x = Plume dilution at location x

C_O = Original concentration of the discharge

C_x = Concentration of the plume at location x

C_A = Concentration of ambient water.

Dilution requirements for this project are derived from the applicable wastewater environmental performance standards and provide the primary measure of discharge mixing effectiveness. These dilution requirements will directly inform the diffuser and rock outfall configuration as the design develops.

3. Rock outfall

3.1 Overview

The land flow path (rock outfall) is a structure located on the delta that allows the treated effluent to pass through and disperse into the Kawarau River. It is intended to minimise the visual impact of the discharge, to provide aeration, land contact prior to the effluent entering the river and to obstruct public contact with the treated effluent. It is recognised that this form of land contact is inadequate to meet the cultural requirements for a land-based discharge as requested by iwi.

Figure 6 Indicative location and area for land flow path (width and details could vary pending further technical assessment and subsequent detailed design)

3.2 Design

The land flow path is to be designed for the full 2060 flow and the details would be refined through the preliminary design stage, but at this stage is assumed to require:

- An earth channel to be formed by reshaping existing ground and providing sufficient depth and cross section. The channel will be filled with rocks to increase the contact of treated effluent with land and provide further aeration. The rock filed channel minimises the risk of public exposure to treated effluent and will blend with the surroundings.
- Average size of rocks will likely be between 350 to 450 mm to be determined in design stage. Geotextile layer and PE liner are proposed to be installed underneath the rocks for minimising the risk of scour and erosion and diverting maximum flow to the river for treatment purpose. Refer to Figure 7 for the preliminary cross section of the rock channel. Additional natural rock may be placed on top to help the structure blend with the surrounding delta environment. The effluent will flow through this into the Kawarau River. At the tie-in to the river's main channel, the rock-filled channel will be increased for enhancing the mixing zone and size of the rocks might be increased to support their stability. Alternative toe protection including rock bags at the location where the rock-filled channel ties into the river's main channel will be investigated in design stage.
- Excavation will be required, with minimal or no offsite disposal anticipated, as excavated material is expected to be reused for site landscaping. Earthworks will include minor cuts to provide sufficient cross section and grade, surface trimming, backfilling, and minor ground improvement. Soft ground conditions are expected, and appropriate ground improvement measures should be implemented.
- Signage and bollards will be installed to prevent water navigations around the rock channel. Some maintenance works for rehabilitating and reshaping the rock outfall, particularly at the main channel of Kawarau River will likely be required after major flood events.

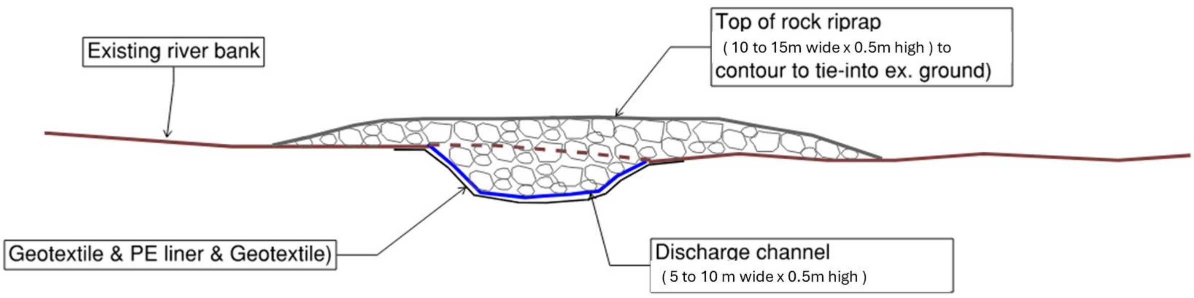


Figure 7 Rock outfall cross section (dimensions indicative)

3.3 Sketch

Figure 8 Indicative artist impression of the proposed rock outfall. Note: width to be determined by mixing zone assessment

Figure 9 Rock outfall location on the delta

3.4 Pros and cons

The following are some advantages and disadvantages with respect to the rock outfall.

Advantages include:

- Ease of construction.
- Easier access for maintenance activities and low operating cost.

Disadvantages include:

- Mixing in Kawarau River limited to the near bank area.

- Reduced mixing may result in low dilution, resulting in the lower dilution wastewater environmental performance standard (WEPS) being applied for consenting (disadvantage because it can impose tighter discharge limits).
- Potential for public contact with treated wastewater.
- Potential adverse effects on navigation and recreational activities.
- Maintenance expected to be required near the river edge following wet weather or high river flow events. Periodic excavation and reinstatement may also be needed where significant sedimentation occurs.

4. Diffuser outfall

4.1 Overview

A diffuser outfall is a submerged discharge structure installed at the downstream end of a conveyance pipeline, designed to release treated effluent into the receiving water body through one or more ports. The diffuser ports control the direction, velocity, and spatial distribution of the discharge, promoting interaction between the effluent and the surrounding river water immediately upon release. Mixing occurs initially through jet-induced turbulence generated at the diffuser ports, followed by further dispersion driven by the ambient river flow. The diffuser is typically located within deeper portions of the river channel to enhance dilution and reduce the impact on the navigation. A diffuser system can be designed to meet all applicable regulatory dilution and mixing-zone requirements.

4.2 Design

The diffuser outfall is designed to achieve defined levels of dilution within the receiving waters, such that increases in effluent-related constituents are rapidly attenuated following discharge. Dilution performance is defined as the ratio of ambient river water mixed with the discharged effluent and is assessed using percentile-based compliance metrics to account for temporal variability in river flow conditions. This is outlined in Section 2.5 of the report.

The key design assumptions and dilution requirements for the indicative design of the diffuser outfall are summarised in Table 3.

Table 3 Indicative diffuser design parameters

Parameter	Value	Note
Maximum Discharge rate	59,579 m^3/d	Equal to 59.6 MLD - Refer Section 2
Concentration at discharge		
Design riverbed level	304 mAD	At KAW25
Maximum water level	310.9 mAD	Refer Section 2
Minimum water level	308.1 mAD	Refer Section 2
Near field dilution requirement	NA	
Mean current velocity inside the river	~1 m/s	Assumed value to be refined through assessment
Dilution target (for moderate dilution under WEPS)	>50-fold	To be achieved within 100 m of the discharge point

To meet the above-mentioned dilution target, the diffuser is designed as a submerged multi-port arrangement located within the active river channel. The diffuser comprises diffuser nozzles, each fitted with a single discharge port, with the total treated wastewater flow distributed almost evenly across the ports. This configuration increases jet-induced entrainment and promotes rapid near-field mixing relative to a single-point discharge.

Initial consideration was given to aligning the diffuser nozzles with the predominant river flow direction to maximise jet-induced mixing. However, spatial variability in riverbed levels, potential sediment interaction with a riverbed mounted pipeline, and navigational constraints were identified as key design considerations. In particular, the presence of a riverbed pipeline and a diffuser structure of approximately 1.5 m height may influence local sedimentation patterns and partially obstruct navigation under certain flow conditions. Accordingly, the indicative design may include diffuser ports aligned generally perpendicular to the river flow, with each port oriented at an angle of approximately 10 to – 20° above the horizontal to maintain effective jet formation while minimising obstruction to navigation and reducing interaction with bed sediments. As an initial design, the diffuser is proposed to be located approximately 2 m below the lowest recorded river water level at the KWR25 cross-section (or KWR26, to be confirmed), where greater water depth is available to support effective mixing.

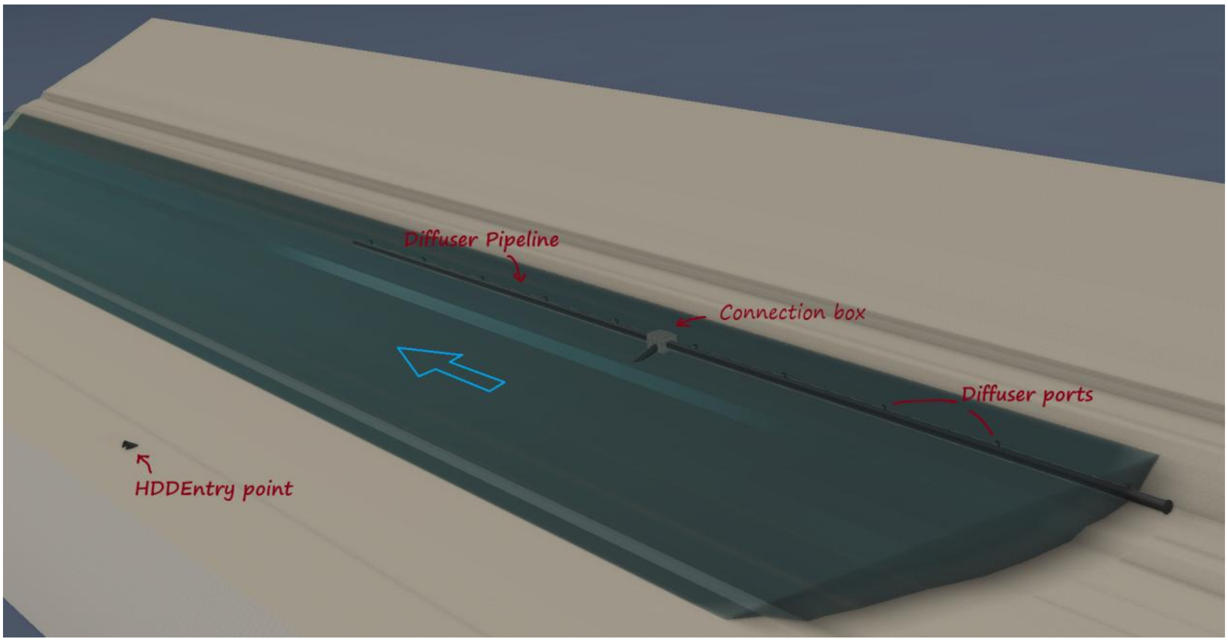
The submerged diffuser structure is connected to the onshore pipeline via a pipe conduit. The conduit could be a horizontal directional drilling (HDD) installation, avoiding disturbance to the riverbank and delta surface. Locating the diffuser on the southern (right-hand) side of the river reduces potential interaction with navigational corridors, particularly at higher water levels, noting that this arrangement results in an increased pipeline length and associated cost, possibly reinforcing the need for requiring HDD operation. The final HDD profile and minimum cover depth are to be confirmed during preliminary design, informed by site-specific geotechnical investigations. The indicative design for the diffuser is for it to be installed on the riverbed (along the bank) and stabilised using concrete collars attached to the pipeline(or in some scenarios piles).

4.3 Design arrangement

Diffuser arrangement 1

An indicative diffuser arrangement is illustrated in Figure 10, showing the diffuser located within the deeper portion of the Kawarau River channel at the KWR25 cross-section. The diffuser pipeline is placed directly on the riverbed and stabilised using concrete collars, providing resistance to buoyancy, hydrodynamic forces, and local scour while maintaining the required diffuser alignment.

While this option may further reduce interaction with primary navigation corridors, it requires a longer pipeline length and additional construction complexity.



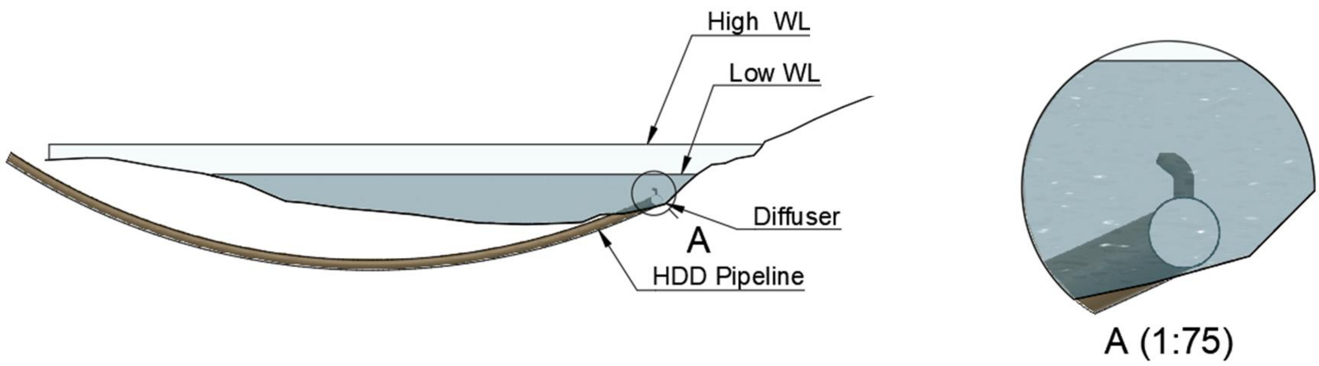


Figure 10 ***Diffuser indicative arrangement – Southern side***

The diffuser port arrangement could be extended horizontally rather than vertically as currently shown; however, this introduces risks, including air trapping and installation stability. This will be reviewed during the preliminary design phase.

Alternative diffuser arrangement 2

An alternative diffuser location on the northern side of the river is illustrated in Figure 7. This option is expected to result in greater interaction with the navigation corridor, particularly during higher water levels. The pipeline can be constructed using the trench and lay-on-bed method, subject to environmental approvals, which could result in a significant reduction in construction cost compared to the HDD installation (noting that environmental restriction and temporary works could elevate costs to the extent that HDD becomes a competitive option – to be confirmed). The final diffuser alignment, river crossing location, and representative cross-sections are to be confirmed during the preliminary design phase, informed by detailed hydraulic modelling, constructability assessment, sediment interaction considerations, and navigation requirements.

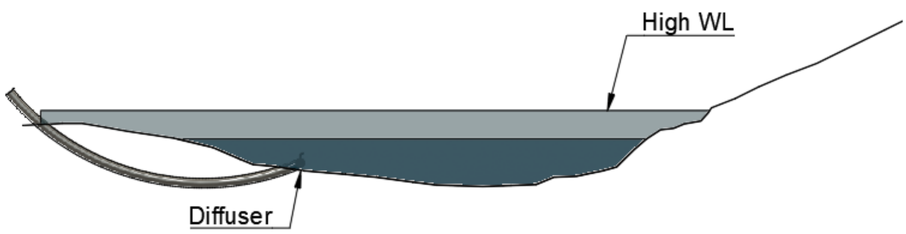


Figure 11 ***Diffuser indicative arrangement – Southern side***

Alternative diffuser arrangement 3

A further alignment option involves extending the diffuser horizontally or diagonally across the river channel. This approach would shorten the overall pipeline length; however, it introduces greater exposure to hydraulic forces and vessel movements within the main navigation corridor. As with Alternative 1, the suitability of this option would require confirmation through detailed hydraulic modelling, constructability review, sediment mobilisation assessment, and navigation risk evaluation.

Environmental approvals will also influence construction methodology and cost.

4.4 Pros and cons

The following are some advantages and disadvantages with respect to the diffuser outfall.

Advantages include:

- Significantly improved mixing by discharging to deeper water in the river channel.
- Reduced visual impact.

- Greater resilience to flood flows.
- Very low potential for public contact with unmixed treated wastewater.
- Improved flexibility for meeting higher dilution targets.

Disadvantages include:

- Higher capital cost
- Operational and maintenance complexity (including potential requirements for inspection, monitoring, and periodic clearing of sediment or gravel accumulation around the diffuser structure).
- Single diffuser arrangement may introduce resilience risks. However, a dual outlet at the end can be implemented to increase resiliency.
- More complex design (including the need for more detailed hydraulic and mixing assessment, sediment interaction assessment and constructability assessments).
- Potential constructability challenges associated with HDD, particularly in loose ground or riverbed conditions dominated by gravels and cobbles, which will require confirmation through site-specific geotechnical investigations.

5. Cost estimates

The following cost estimates are provided solely for comparing the outfall options and are not intended for budgeting purposes.

Assumptions:

- The diffuser outfall estimate
    - HDD price derived from a similar past project, and the cost was scaled down for the size of this outfall.
    - A conversion rate of 1.16 was used to convert from AUD to NZD.
    - Costing of diffuser including transportation, installation and connection is assumed to be in the same ball park as the HDD cost (including contingencies).
    - Complexities associated with the river access during the installation add extra cost, which cannot be evaluated .
- Costs exclude the DN900 pipeline conveyance infrastructure, except for where the additional conveyance length required.
    - An additional estimated 250 m of DN900 conveyance is required for the rock outfall option.
- The rock outfall was based off the Shotover short list optioneering cost estimate rates, with some updates to the size of the rip rap channel and earth works associated with this.
- The rock outfall costs include cost for commissioning, onsite overhead, contractors risk and offsite overhead. The % for each of these matches the Shotover short list optioneering costing approach.

Estimated costs:

- Diffuser outfall estimated construction cost: NZD 8.4M to 12.8M.
- Rock outfall estimated construction cost: NZD 3.8M – 4.3M.
- Between the two options, rock outfall is expected to have a **lower** operating cost.

6. Summary

Table 4 Rock outfall vs diffuser summary table

Option	Rock outfall	Diffuser outfall
Advantages	- Ease of construction. - Easier access for maintenance activities and low OPEX cost.	- Improved mixing by discharging to deeper water in the river channel. - Reduced visual impact. - Greater resilience to flood flows. - Very low potential for public contact with unmixed treated wastewater. Improved flexibility for meeting higher dilution targets.
Disadvantages	- Mixing in Kawarau River limited to the near bank area. - Reduced mixing may result in the lower dilution, resulting in the lower dilution wastewater environmental performance standard (WEPS) being applied for consenting (disadvantage because it can impose tighter discharge limits and higher compliance costs). - Greater potential for public contact with treated wastewater. - Potential maintenance works required after major flood events and potential need for periodic reinstatement. - Potential adverse effects on navigation and recreational activities during high water level periods.	- Increased operational and maintenance complexity (including potential requirements for inspection, monitoring, and periodic clearing of sediment or gravel accumulation around the diffuser structure). - Single diffuser arrangement may introduce resilience risks. However, a dual outlet at the end can be implemented to increase resiliency. - Complex design (including the need for detailed hydraulic, mixing, sediment interaction, and constructability assessments). - Potential constructability challenges associated with HDD, particularly in loose ground or riverbed conditions dominated by gravels and cobbles, which will require confirmation through site-specific geotechnical investigations.
Cost comparison (only for comparison purposes, not budgetary)	Estimated CAPEX: 3.8M to 4.3M (NZD). Opex: Low.	Estimated CAPEX: 8.4M to 12.8M (NZD). Opex: Low to moderate.

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Appendices

Appendix A

Outfall visualisation (Boffa Miskell)

DRAFT

Boffa Miskell

SHOTOVER WASTEWATER DISCHARGE

VISUALISATIONS

28 JANUARY 2026

SHOTOVER WASTEWATER DISCHARGE

Contents

MAPS

VISUALISATIONS

Boffa Miskell

www.boffamiskell.co.nz

0 100 m

1:5,000 @ A3

DRAFT

Data Sources: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors., Eagle Technology, LINZ

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

Indicative Outfall Alignment

Visualisation Viewpoint

SHOTOVER WASTEWATER DISCHARGE

Visualisation Viewpoint Location

Date: 28 January 2026 | Revision: 0

Plan prepared for GHD by Boffa Miskell Limited

Project Manager: Megan.Harshey@boffamiskell.co.nz | Drawn: CMu | Checked: MHa

Boffa Miskell

www.boffamiskell.co.nz

Viewpoint Details

NZTM Easting	: 1 266 888.6 mE
NZTM Northing	: 5 006 379.6 mN
Elevation/Eye Height	: 308.1m / Seated in jetboat
Date of Photography	: 7:51AM 23 January 2026 NZDT
Horizontal Field of View	: 40°
Vertical Field of View	: 25°
Projection	: NA
Image Reading Distance @ A3 is 50 cm	

Data Sources: Land Information New Zealand, Open Topography, GHD.

SHOTOVER WASTEWATER DISCHARGE

Visualisation 1A

Date: 28 January 2026 | Revision: 0

Plan prepared for GHD by Boffa Miskell Limited

Project Manager: Megan.Harshey@boffamiskell.co.nz | Drawn: CMu | Checked: MHa

VS1A

File Ref: BM250359_Outfall_Visualisation.indd

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Viewpoint Details

NZTM Easting	: 1 266 888.6 mE	Horizontal Field of View	: 40°
NZTM Northing	: 5 006 379.6 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 308.1m / Seated in jetboat	Projection	: NA
Date of Photography	: 7:51AM 23 January 2026 NZDT	Image Reading Distance @ A3 is 50 cm	

Data Sources: Land Information New Zealand, Open Topography, GHD.

SHOTOVER WASTEWATER DISCHARGE

Visualisation 1B

Date: 28 January 2026 | Revision: 0

Plan prepared for GHD by Boffa Miskell Limited

Project Manager: Megan.Harshey@boffamiskell.co.nz | Drawn: CMu | Checked: MHa

VS1B

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Viewpoint Details

NZTM Easting	: 1 266 888.6 mE
NZTM Northing	: 5 006 379.6 mN
Elevation/Eye Height	: 805.8m / 1.5m
Date of Photography	: 2:22PM 23 January 2026 NZDT
Horizontal Field of View	: 40°
Vertical Field of View	: 25°
Projection	: NA
Image Reading Distance @ A3 is 50 cm	

Data Sources: Land Information New Zealand, Open Topography, GHD.

SHOTOVER WASTEWATER DISCHARGE

Visualisation 2A

Date: 28 January 2026 | Revision: 0

Plan prepared for GHD by Boffa Miskell Limited

Project Manager: Megan.Harshey@boffamiskell.co.nz | Drawn: CMu | Checked: MHa

VS2A

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Viewpoint Details

NZTM Easting : 1 266 888.6 mE
NZTM Northing : 5 006 379.6 mN
Elevation/Eye Height : 805.8m / 1.5m
Date of Photography : 2:22PM 23 January 2026 NZDT

Horizontal Field of View : 40°
Vertical Field of View : 25°
Projection : NA
Image Reading Distance @ A3 is 50 cm

Data Sources: Land Information New Zealand, Open Topography, GHD.

SHOTOVER WASTEWATER DISCHARGE

Visualisation 2B

Date: 28 January 2026 | Revision: 0

Plan prepared for GHD by Boffa Miskell Limited

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VS2B